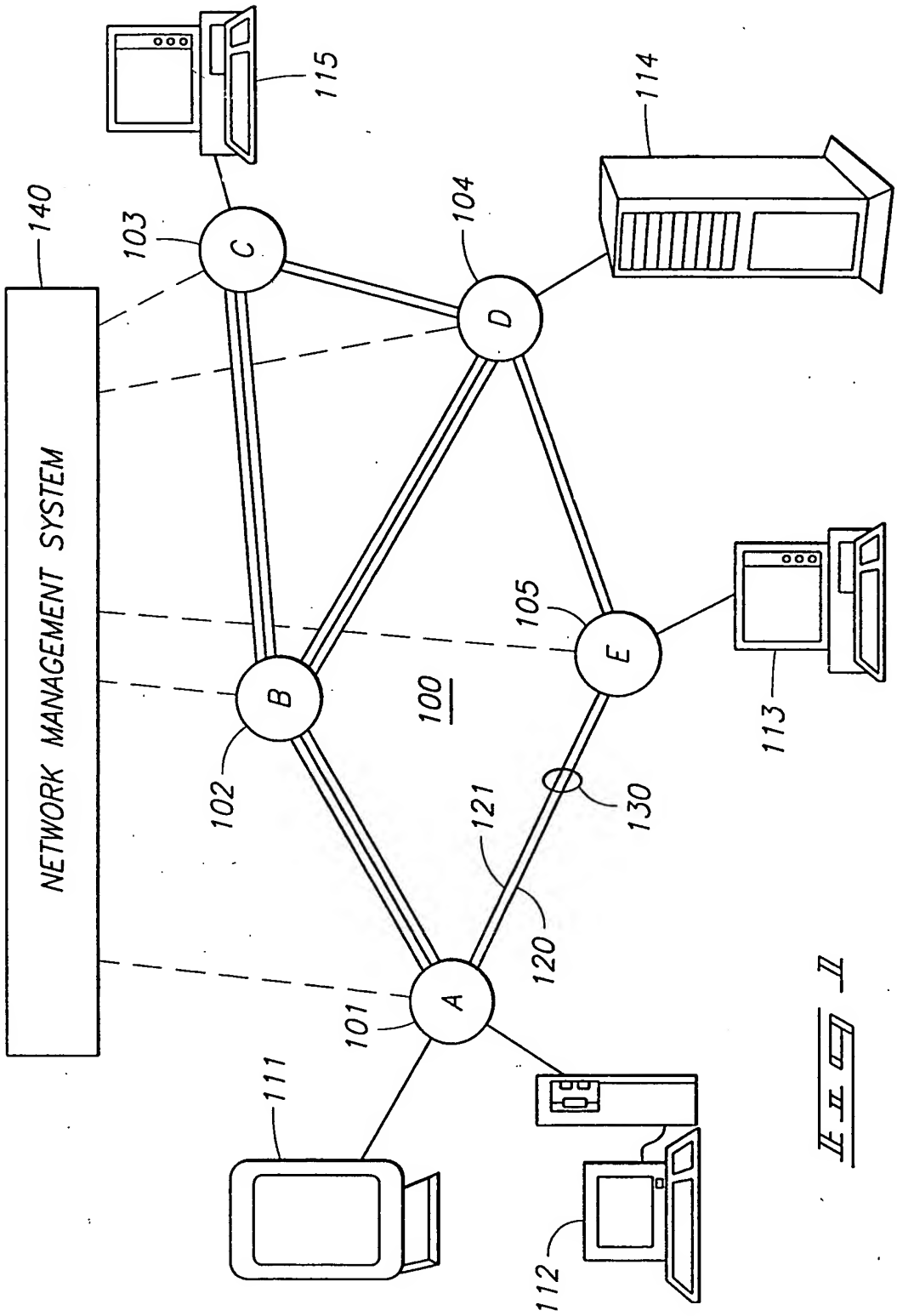

NETWORK MANAGEMENT SYSTEM
140
A
B
C
D
E
100
101
102
103
104
105
111
112
113
114
115
120
121
130

FIG 1

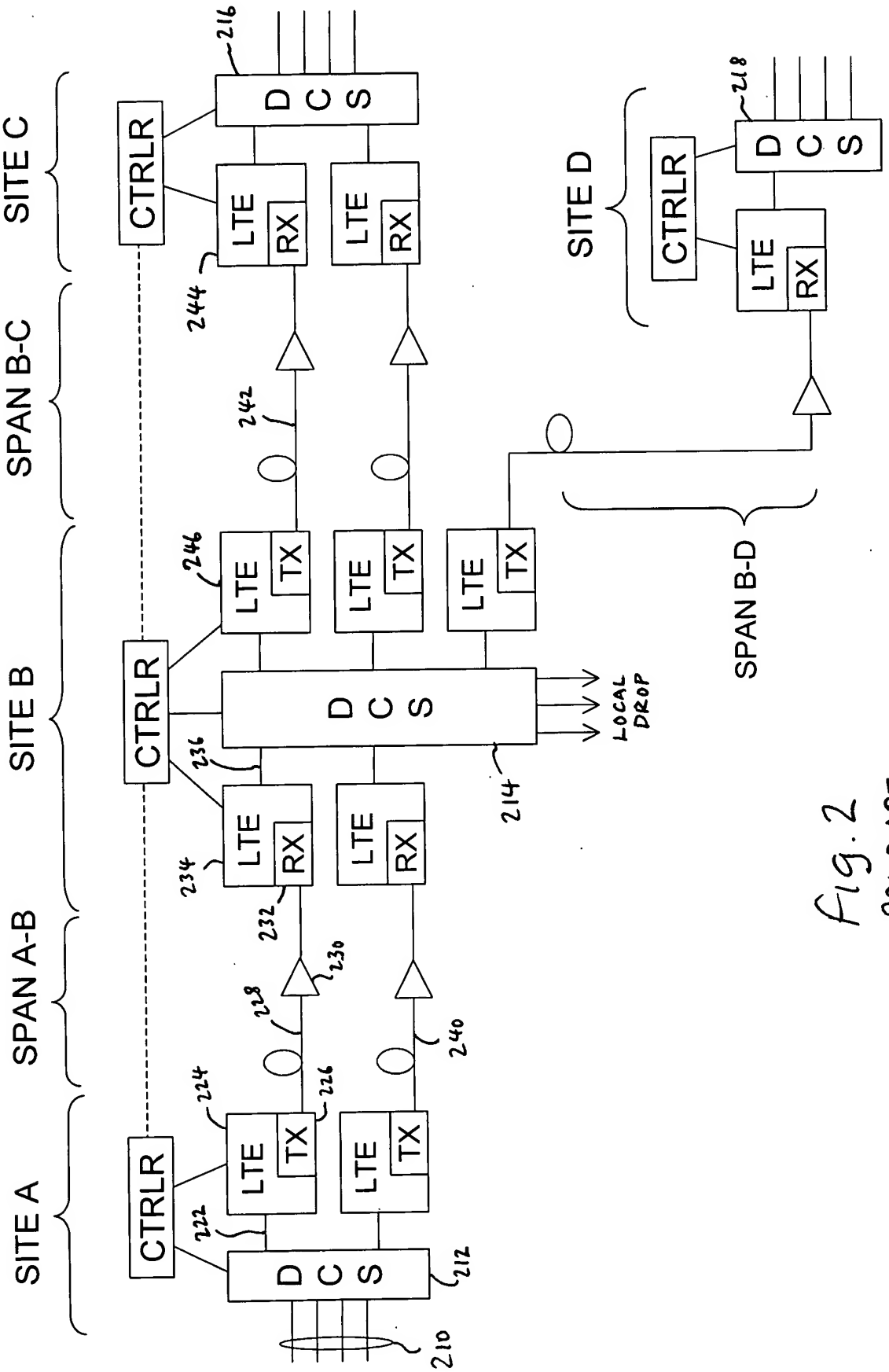


Fig. 2
PRIOR ART

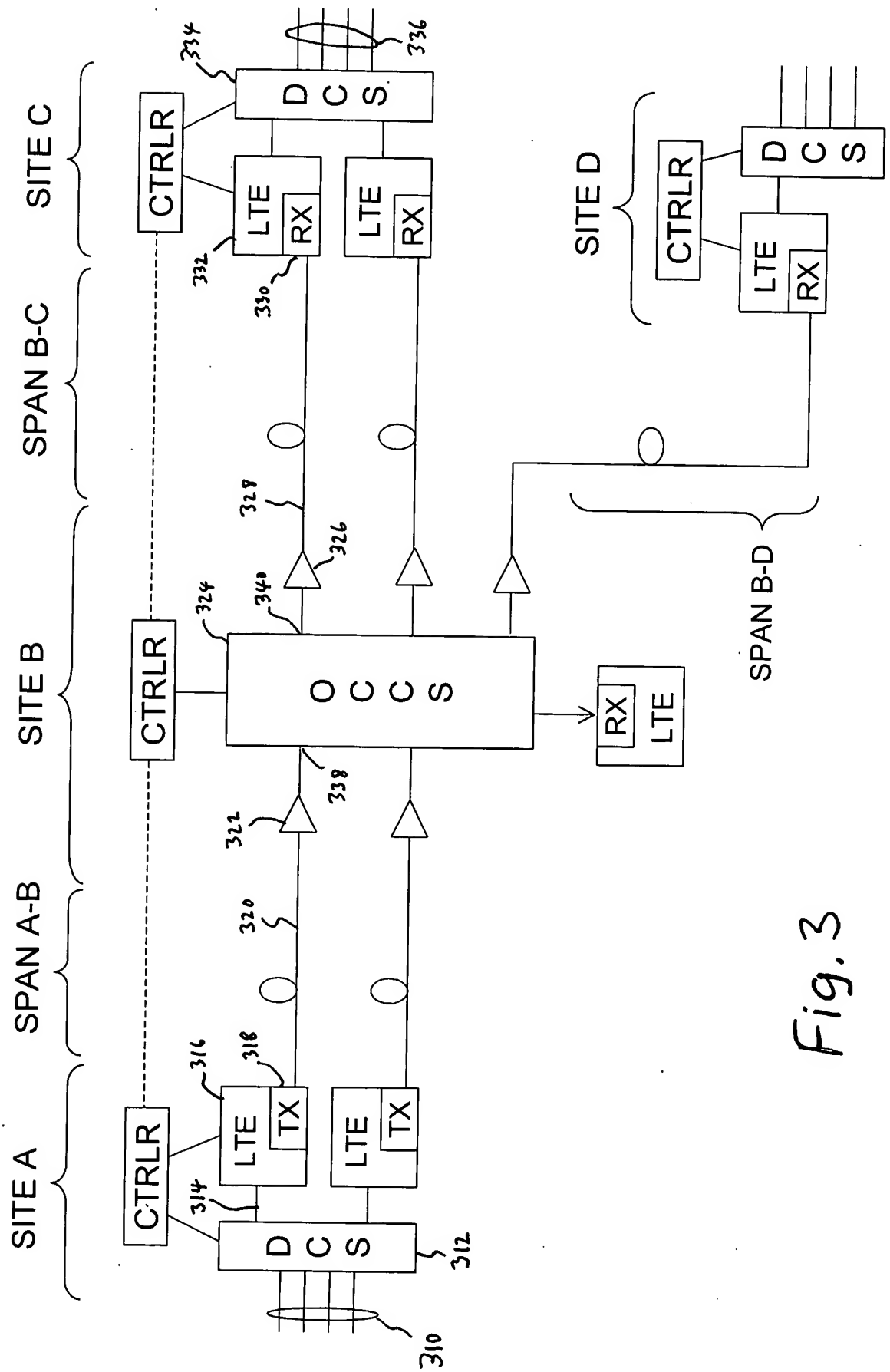

SITE A
SPAN A-B
SITE B
SPAN B-C
SITE C
SITE D
SPAN B-D
CTRLR
LTE
TX
RX
D C S
O C C S
310
312
314
316
318
320
322
324
326
328
330
332
334
336
338
340

Fig. 3

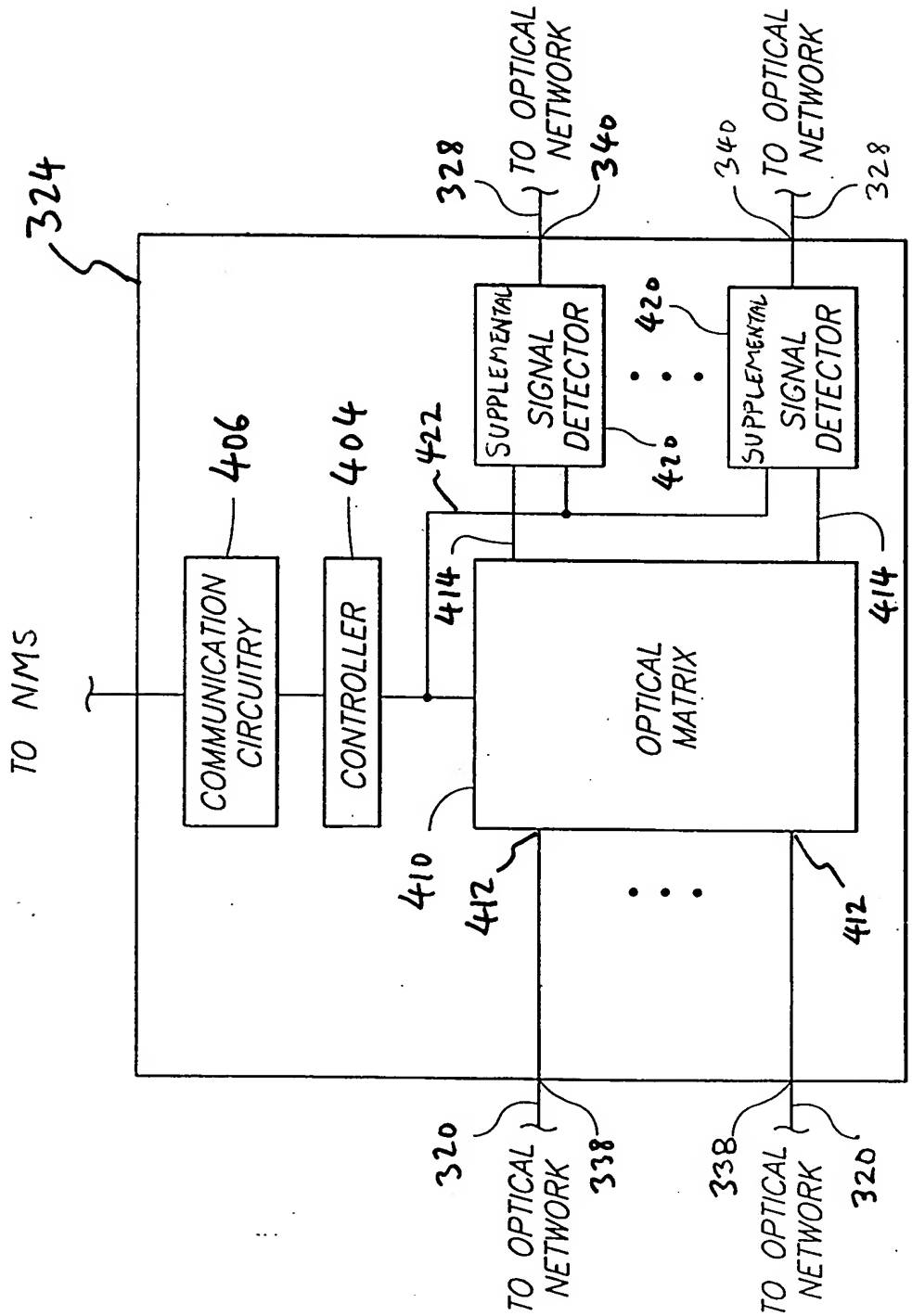

324
TO NMS
COMMUNICATION CIRCUITRY
406
CONTROLLER
404
422
414
OPTICAL MATRIX
414
410
412
412
SUPPLEMENTAL SIGNAL DETECTOR
420
420
SUPPLEMENTAL SIGNAL DETECTOR
328
TO OPTICAL NETWORK
340
340
TO OPTICAL NETWORK
328
320
TO OPTICAL NETWORK
338
338
TO OPTICAL NETWORK
320

FIG. 4

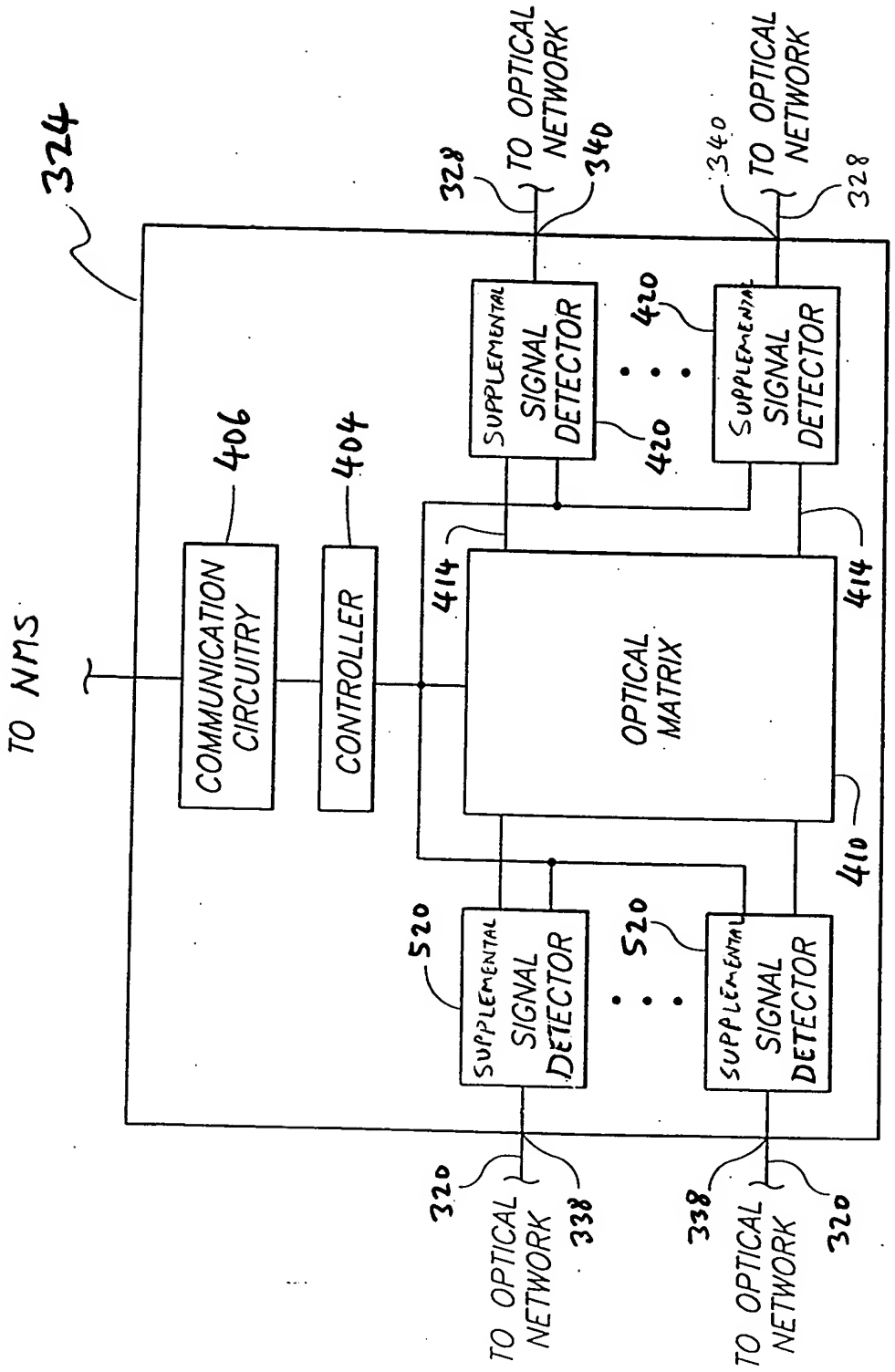

324
TO NMS
406
COMMUNICATION CIRCUITRY
404
CONTROLLER
414
OPTICAL MATRIX
410
328
TO OPTICAL NETWORK
340
SUPPLEMENTAL SIGNAL DETECTOR
420
520
320
338

FIG 5

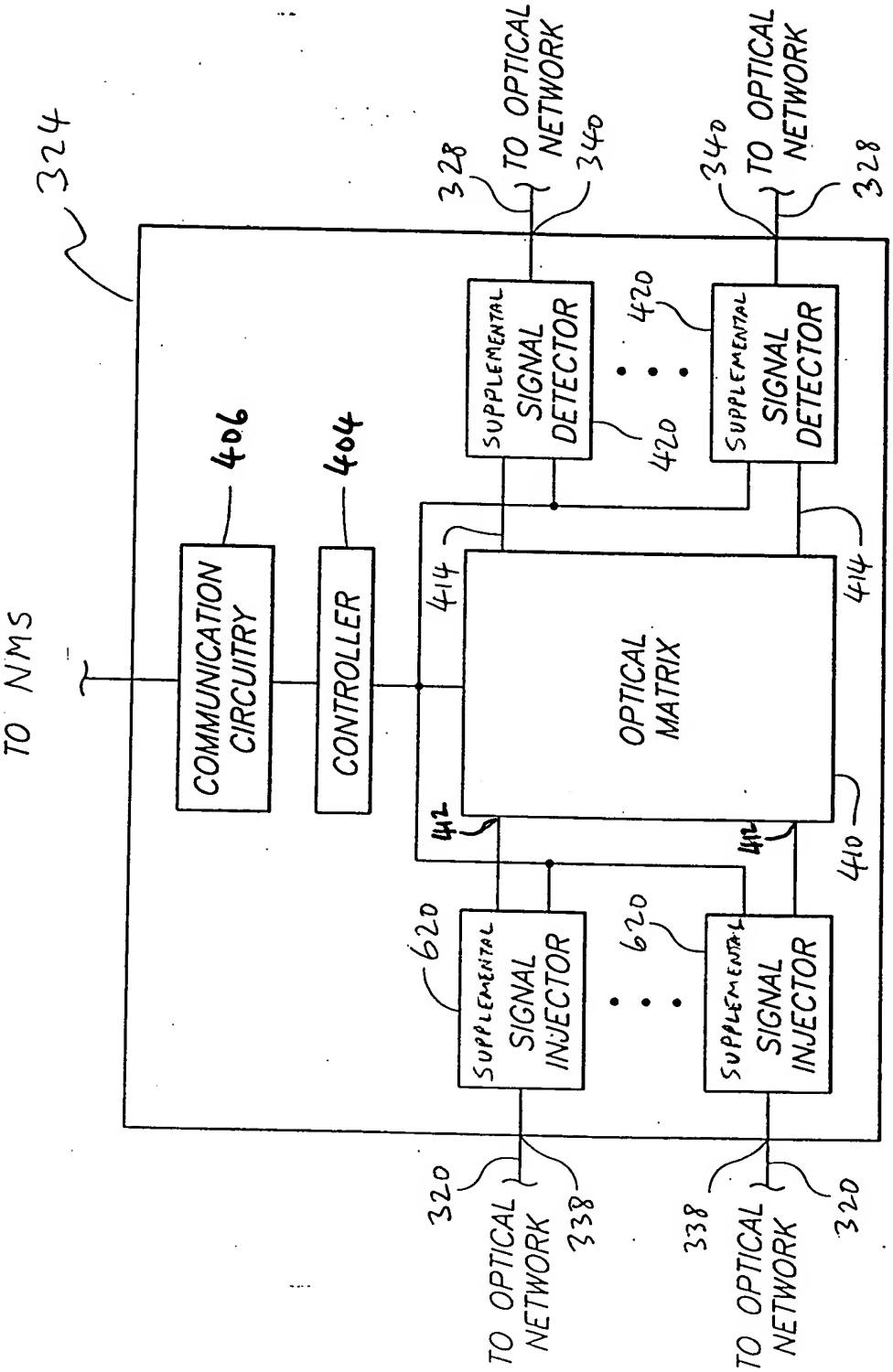

324
TO NMS
COMMUNICATION CIRCUITRY
406
CONTROLLER
404
OPTICAL MATRIX
414
412
410
SUPPLEMENTAL SIGNAL DETECTOR
420
SUPPLEMENTAL SIGNAL INJECTOR
620
328
340
320
338
TO OPTICAL NETWORK

FIG 6

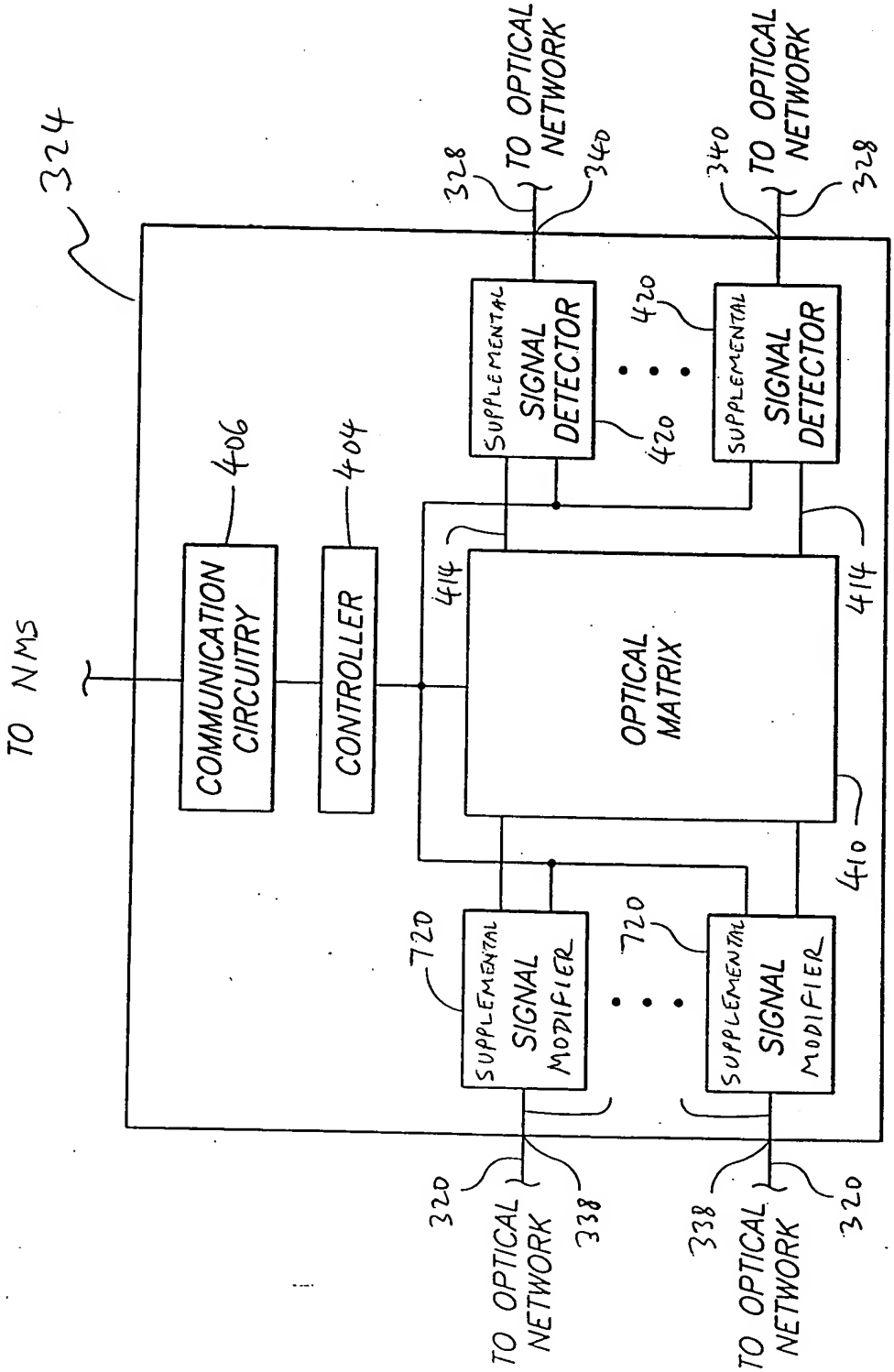

324
TO NMS
COMMUNICATION CIRCUITRY
406
CONTROLLER
404
OPTICAL MATRIX
410
414
414
SUPPLEMENTAL SIGNAL DETECTOR
420
420
SUPPLEMENTAL SIGNAL DETECTOR
328
TO OPTICAL NETWORK
340
340
TO OPTICAL NETWORK
328
SUPPLEMENTAL SIGNAL MODIFIER
720
720
SUPPLEMENTAL SIGNAL MODIFIER
320
TO OPTICAL NETWORK
338
338
TO OPTICAL NETWORK
320

FIG 7

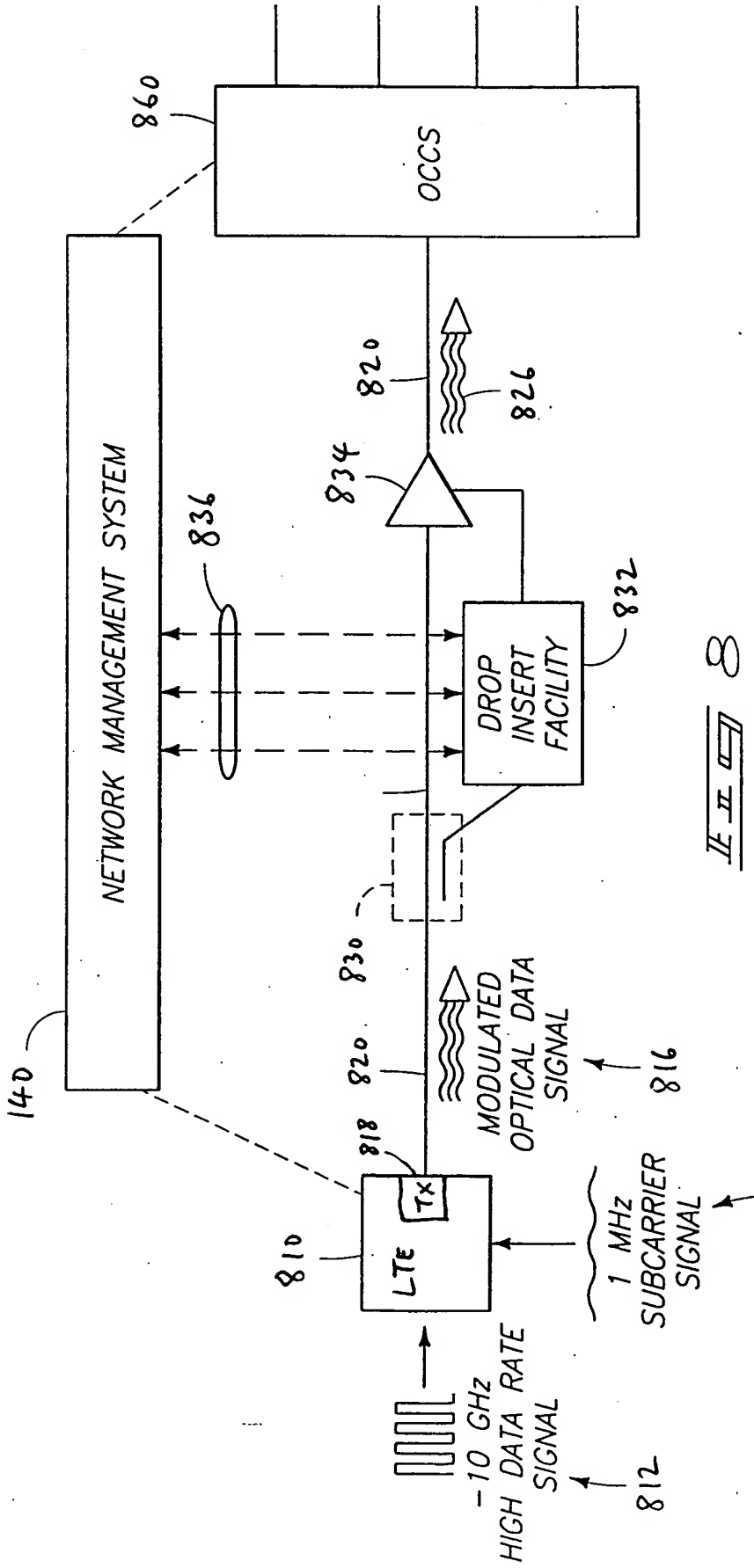

860
OCCS
NETWORK MANAGEMENT SYSTEM
140
820
826
834
836
832
DROP INSERT FACILITY
830
820
MODULATED OPTICAL DATA SIGNAL
816
818
Tx
LTE
810
1 MHz SUBCARRIER SIGNAL
814
~10 GHz HIGH DATA RATE SIGNAL
812

FIG 8

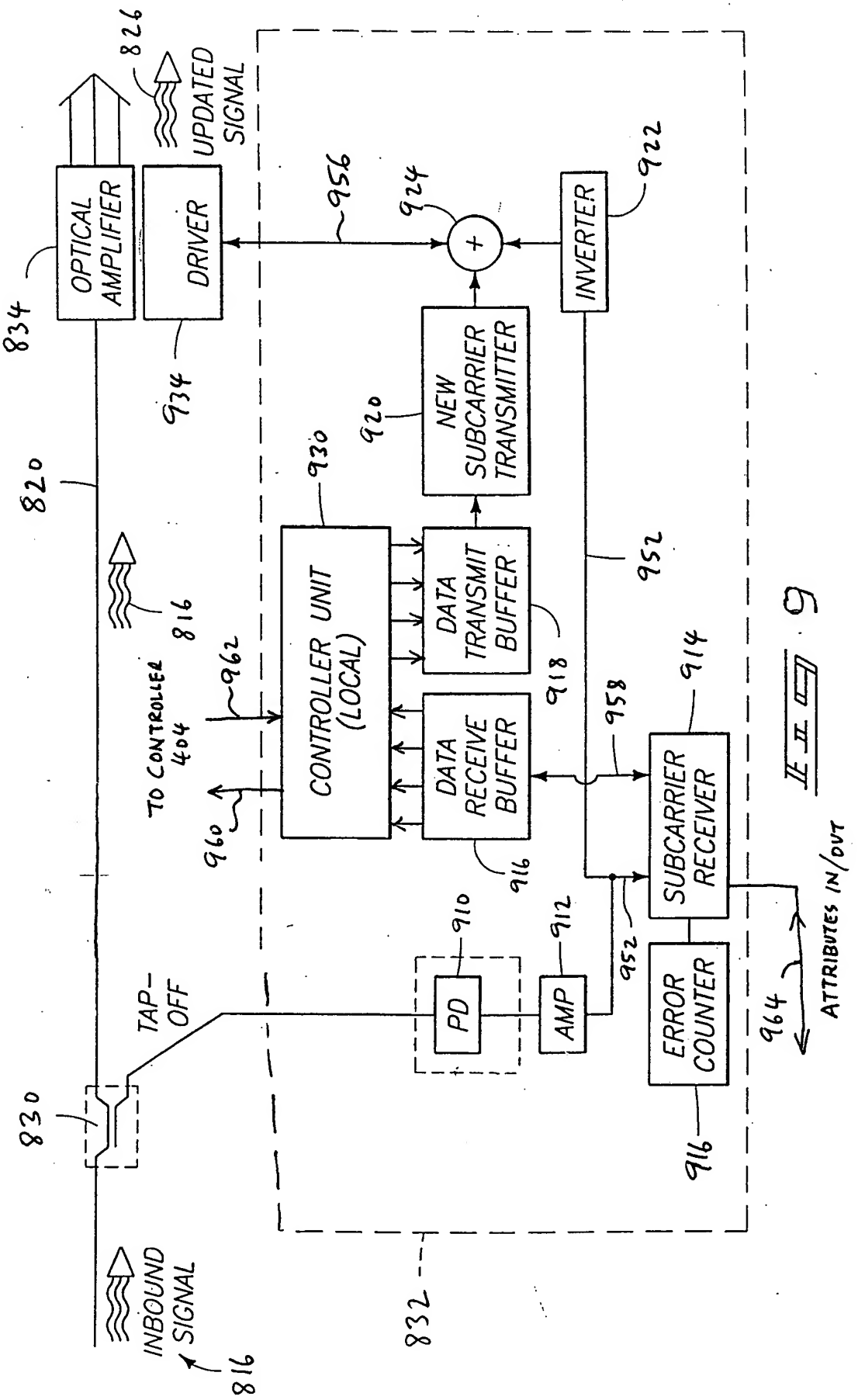

826
UPDATED SIGNAL
OPTICAL AMPLIFIER
DRIVER
956
924
INVERTER
922
834
934
820
NEW SUBCARRIER TRANSMITTER
920
930
816
CONTROLLER UNIT (LOCAL)
DATA TRANSMIT BUFFER
952
962
TO CONTROLLER 404
DATA RECEIVE BUFFER
918
958
914
960
916
SUBCARRIER RECEIVER
910
912
952
TAP-OFF
PD
AMP
ERROR COUNTER
964
ATTRIBUTES IN/OUT
830
916
832
INBOUND SIGNAL
816

FIG. 9

Fig. 10

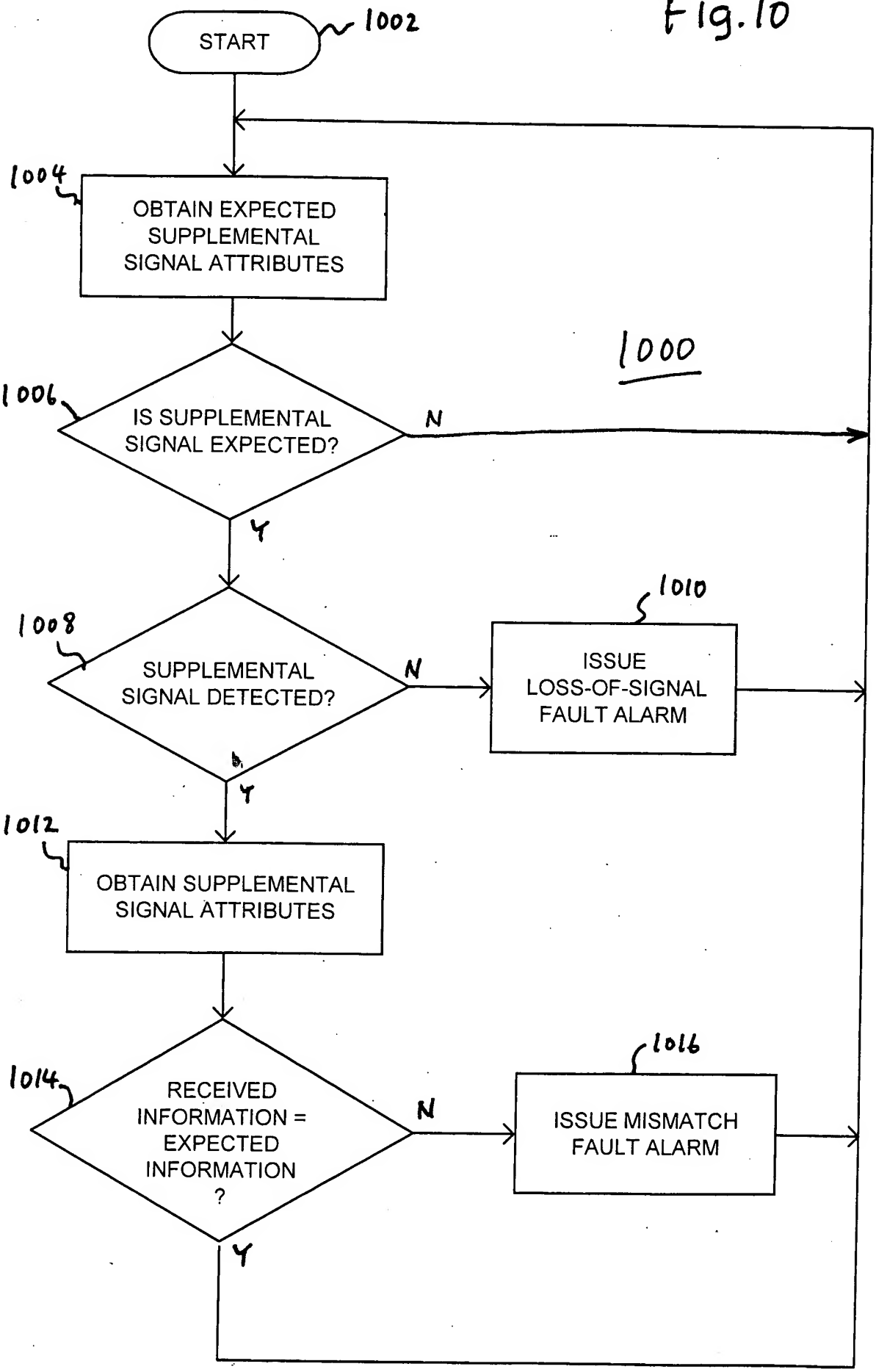

START
1002
1004
OBTAIN EXPECTED SUPPLEMENTAL SIGNAL ATTRIBUTES
1000
1006
IS SUPPLEMENTAL SIGNAL EXPECTED?
N
Y
1008
SUPPLEMENTAL SIGNAL DETECTED?
N
1010
ISSUE LOSS-OF-SIGNAL FAULT ALARM
Y
1012
OBTAIN SUPPLEMENTAL SIGNAL ATTRIBUTES
1014
RECEIVED INFORMATION = EXPECTED INFORMATION ?
N
1016
ISSUE MISMATCH FAULT ALARM
Y

Fig. 11

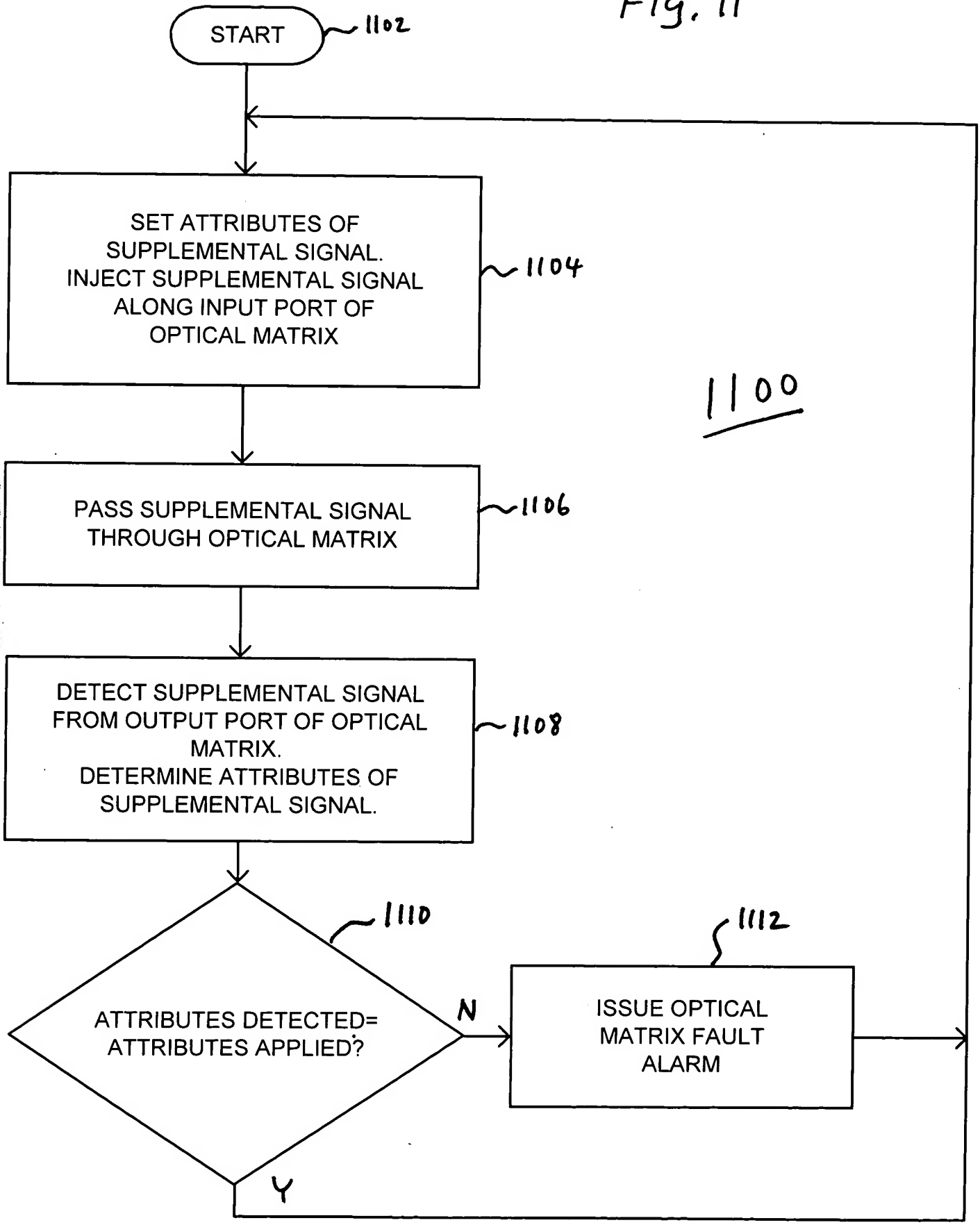

START
1102
SET ATTRIBUTES OF SUPPLEMENTAL SIGNAL. INJECT SUPPLEMENTAL SIGNAL ALONG INPUT PORT OF OPTICAL MATRIX
1104
1100
PASS SUPPLEMENTAL SIGNAL THROUGH OPTICAL MATRIX
1106
DETECT SUPPLEMENTAL SIGNAL FROM OUTPUT PORT OF OPTICAL MATRIX. DETERMINE ATTRIBUTES OF SUPPLEMENTAL SIGNAL.
1108
ATTRIBUTES DETECTED= ATTRIBUTES APPLIED?
1110
N
ISSUE OPTICAL MATRIX FAULT ALARM
1112
Y

Fig. 12

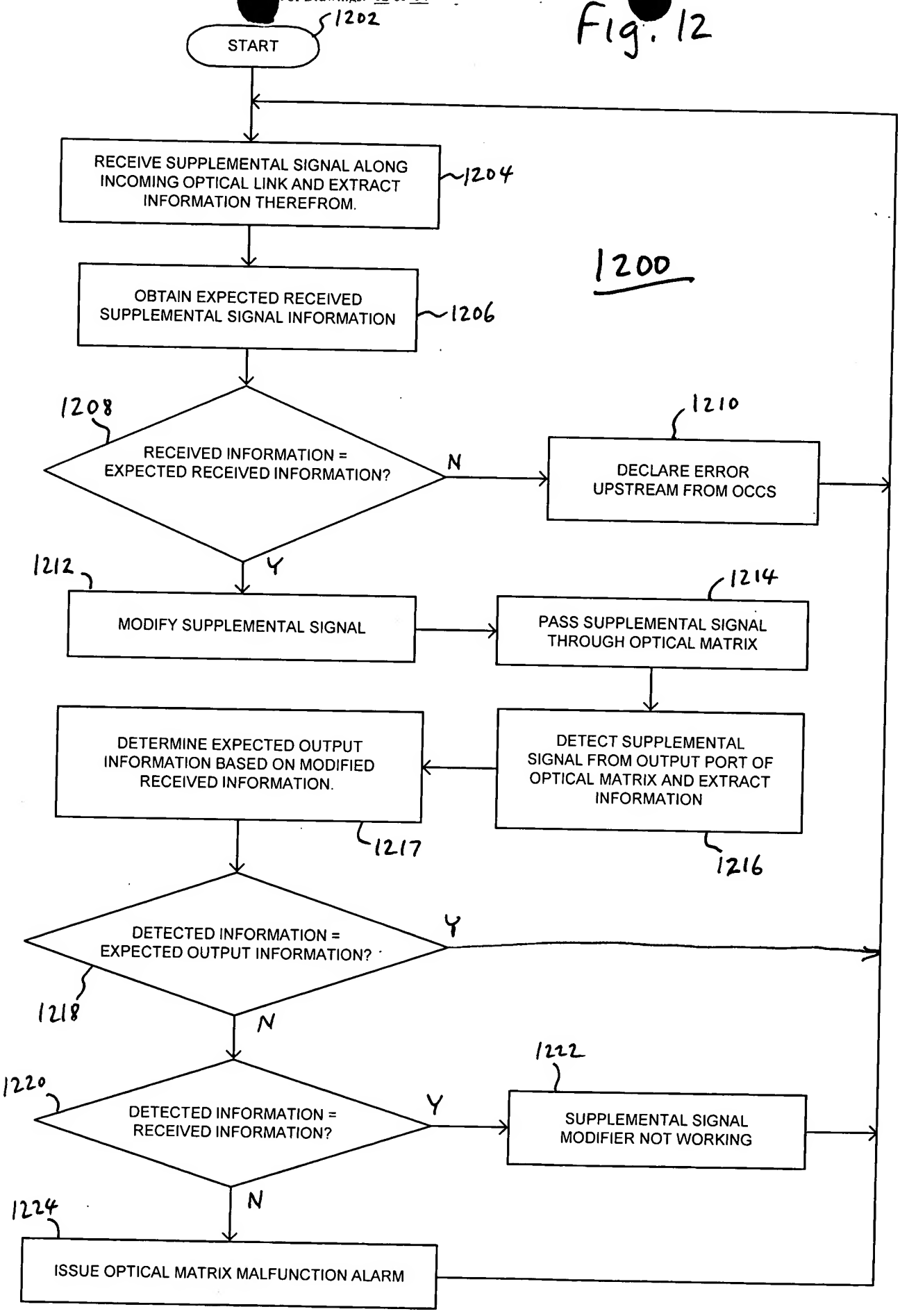

START
1202
RECEIVE SUPPLEMENTAL SIGNAL ALONG INCOMING OPTICAL LINK AND EXTRACT INFORMATION THEREFROM.
1204
1200
OBTAIN EXPECTED RECEIVED SUPPLEMENTAL SIGNAL INFORMATION
1206
1208
RECEIVED INFORMATION = EXPECTED RECEIVED INFORMATION?
N
1210
DECLARE ERROR UPSTREAM FROM OCCS
Y
1212
MODIFY SUPPLEMENTAL SIGNAL
1214
PASS SUPPLEMENTAL SIGNAL THROUGH OPTICAL MATRIX
DETERMINE EXPECTED OUTPUT INFORMATION BASED ON MODIFIED RECEIVED INFORMATION.
1217
DETECT SUPPLEMENTAL SIGNAL FROM OUTPUT PORT OF OPTICAL MATRIX AND EXTRACT INFORMATION
1216
DETECTED INFORMATION = EXPECTED OUTPUT INFORMATION?
Y
1218
N
1220
DETECTED INFORMATION = RECEIVED INFORMATION?
Y
1222
SUPPLEMENTAL SIGNAL MODIFIER NOT WORKING
N
1224
ISSUE OPTICAL MATRIX MALFUNCTION ALARM

Fig 13

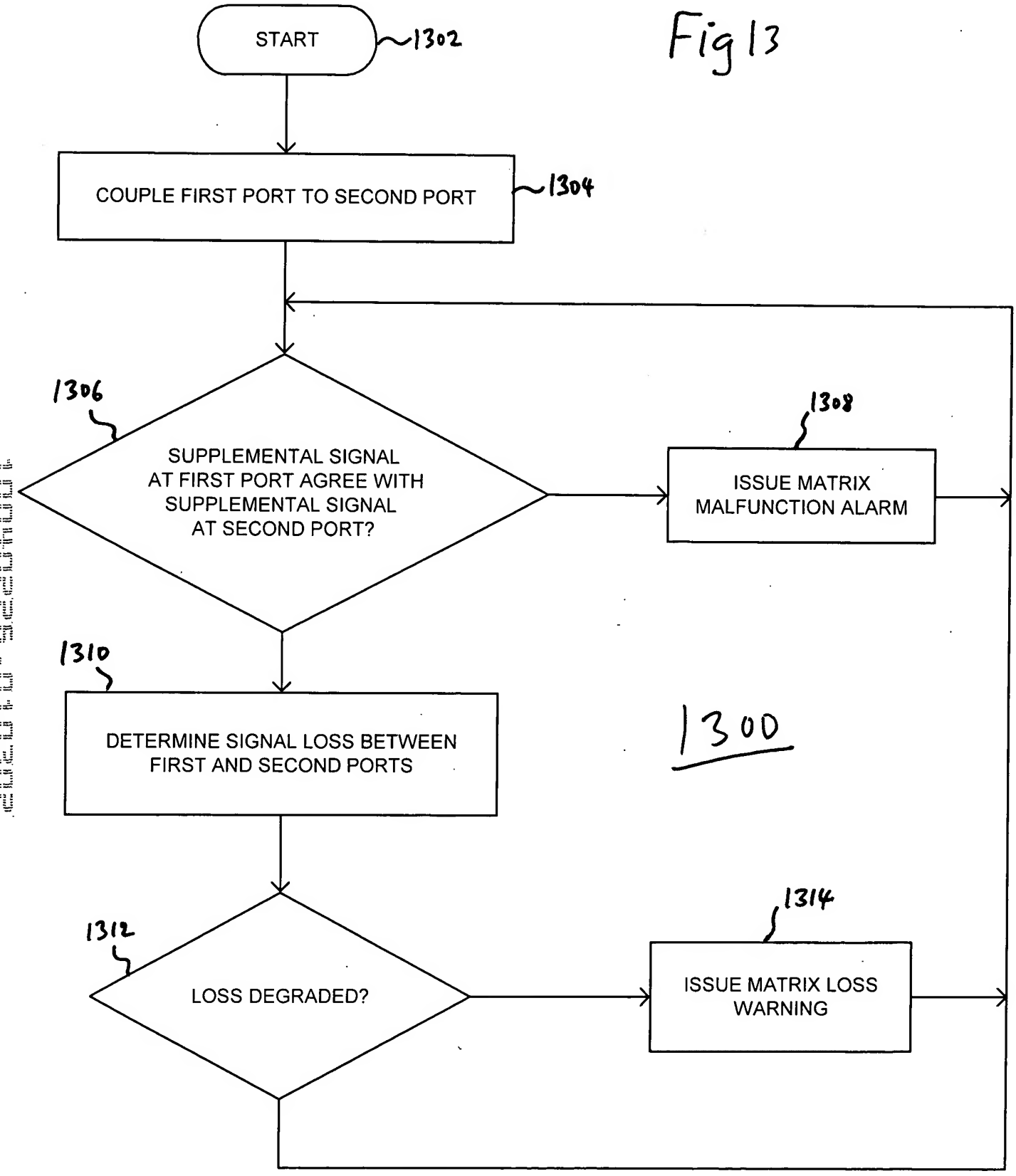
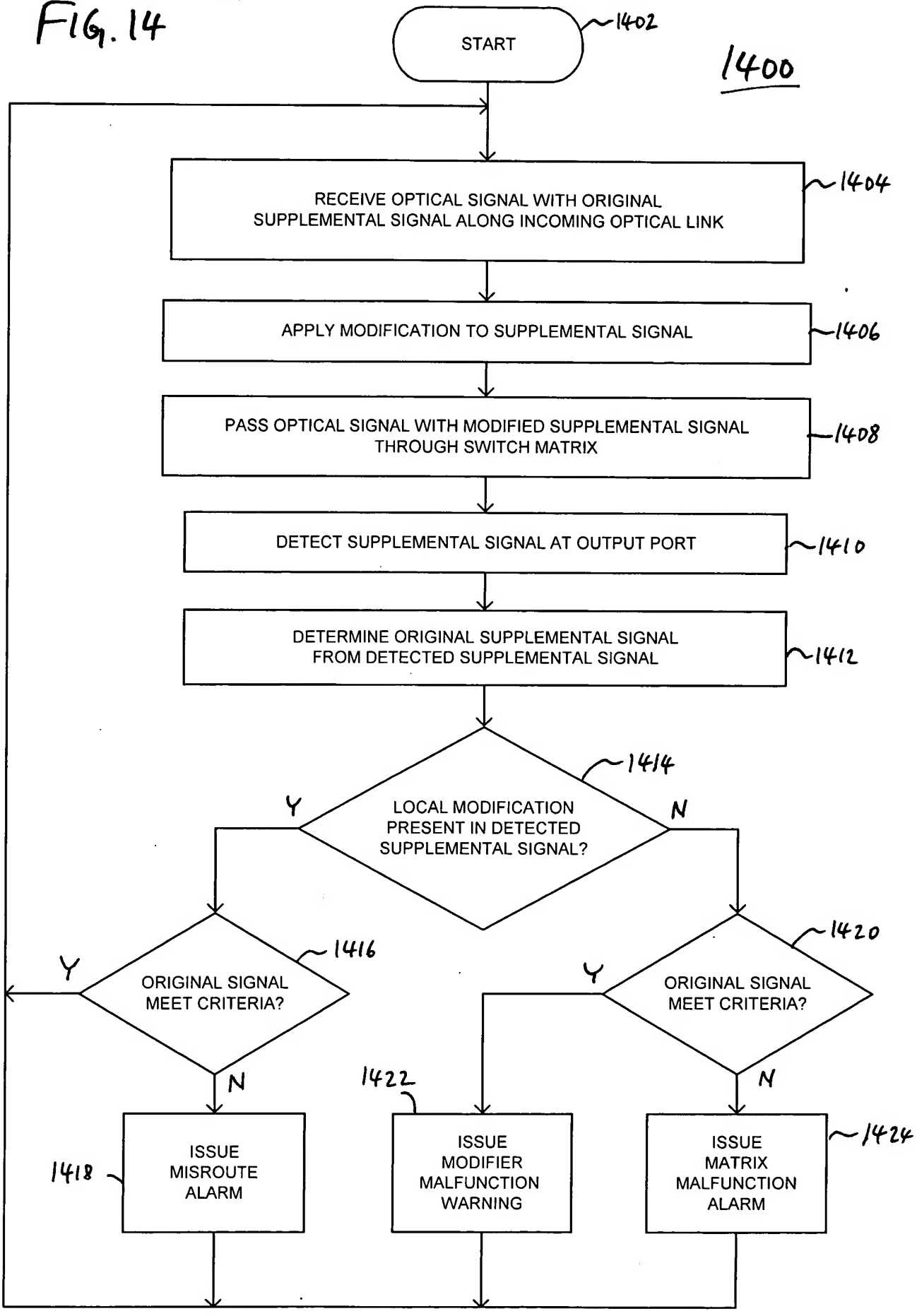

START
1302
COUPLE FIRST PORT TO SECOND PORT
1304
1306
SUPPLEMENTAL SIGNAL AT FIRST PORT AGREE WITH SUPPLEMENTAL SIGNAL AT SECOND PORT?
1308
ISSUE MATRIX MALFUNCTION ALARM
1310
DETERMINE SIGNAL LOSS BETWEEN FIRST AND SECOND PORTS
1300
1312
LOSS DEGRADED?
1314
ISSUE MATRIX LOSS WARNING

FIG. 14


1400
START
1402
RECEIVE OPTICAL SIGNAL WITH ORIGINAL SUPPLEMENTAL SIGNAL ALONG INCOMING OPTICAL LINK
1404
APPLY MODIFICATION TO SUPPLEMENTAL SIGNAL
1406
PASS OPTICAL SIGNAL WITH MODIFIED SUPPLEMENTAL SIGNAL THROUGH SWITCH MATRIX
1408
DETECT SUPPLEMENTAL SIGNAL AT OUTPUT PORT
1410
DETERMINE ORIGINAL SUPPLEMENTAL SIGNAL FROM DETECTED SUPPLEMENTAL SIGNAL
1412
LOCAL MODIFICATION PRESENT IN DETECTED SUPPLEMENTAL SIGNAL?
1414
Y
N
ORIGINAL SIGNAL MEET CRITERIA?
1416
Y
N
ORIGINAL SIGNAL MEET CRITERIA?
1420
Y
N
ISSUE MISROUTE ALARM
1418
ISSUE MODIFIER MALFUNCTION WARNING
1422
ISSUE MATRIX MALFUNCTION ALARM
1424